

SENSORIAL QUALITY OF THE MEAT OF NON-CASTRATED AND CASTRATED MALE OF THE NATIVE BREED OF CHICKENS CASTELLANA NEGRA

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BACKGROUND

The technique of castration has been carried for a long time in order to achieve meat of a higher organoleptic quality. The literature about surgical castration is large, both traditional (Bostford, 1954 y Slocum *et al.* 1954) and modern, with no significant differences (Cubilo *et al.* 1996). There is a second form for obtaining capons by used of chemical products, this however is forbidden in the US countries because of its negative consequences on human health.

The extirpation of the testicles brings along a change in the metabolism of the animal, this generates changes in growth (Cubilo *et al.* 1999), in behaviour, in the tissue composition (Tor *et al.*, 1999), in the chemical composition and the organoleptic quality of the meat (Dalle Zotte *et al.*, 2000).

OBJECTIVES

On this study we try to compare the technological and sensorial quality of the roosters and capons of Castellana Negra. We intend to catalogue the meat obtained from native animals once it has been studied their growth capacity and productive yield in previous works carried out by this research group. The present paper is completed with the technological study of the meat, the results of which are published in the records of this Convention.

METHODS

a) Biological material and methodology.

110 males of Castellana Negra were used for the test, they were divided into two groups, one with castrated (55 animals) and other with non-castrated (55 animals) which

were used for control. Both groups were kept in closed parks until the slaughter, the parks having 12,5m² (density of 4 animals/m²).

I one of the groups the castration, with anaesthesia, was carried out at 7 weeks following the techniques described by Cubilo y Tor (1996).

The feeding was supply "ab libitum", using the same fodder during the breeding with 2.800 kcal of metabolising energy and 18% of crude protein.

At 33 weeks, 10 animals chosen at random were slaughtered in each group; capons and roosters.

The canal yield was determined having been stored the canals at 2°C following the quartering methodology described in the work group nº5 in WPSA (1984).

b) Sensorial Analysis.

The sensorial analysis of the meat was carried out by a board of experienced tasters of the department of Producción Animal of the Veterinary Science Faculty of Zaragoza. They were 8 tasters altogether and they tasted the meat in three sessions during two days. The measures to consider were smell, juiciness, fibrosity, flavour intensity, flavour quality and global appreciation of the samplers (breasts of males and castrated). The variables were marked from 1 to 10.

c) Statistic treatment.

The data obtained were analysed statistically by a general lineal model of variant analysis of the computer software SPSS version 10.0 for windows.

RESULTS AND DISCUSSION

Table 1 shows that the castrated animals had a highest juiciness and lowest fibrosity than the non-castrated, probably due to the highest fat content in these animals. On the other hand, the non-castrated animals have a highest intensity of flavour and residues than the castrated, as it was showed by Ricard *et al.*, (1988) who states that the meat of non-castrated shows a higher flavour and that capon meat is really valued by its tenderness and greasiness". This situation may be in accordance with the ideas described about pig breeding by Coma y Piquer (1999) since the major concentration of sexual hormones in the greasy tissue will account for the higher intensity in flavour.

The chickens that keep their reproductive organs suffer changes according to the age and the grow of the animal. The muscular fibres grow a lot and the connective tissue increases in quantity and hardness, being produced a meat with a more fibre and less tender (Benjamin *et al.*, 1849). The castration of the male alters the course of the sexual maturity and its productions are less tender and tasteful than those coming from non-castrated animals (Mas *et al.*, 1981).

York *et al.*, (1969) stated that the capons surgically castrated at 4 weeks and slaughtered at 11 weeks weighed less and had a worse food efficiency than the animals used for control (non-castrated) although the capons were given better marks in tenderness, juiciness and flavour, following the results shown in this work.

Walter (1976) obtains similar results carrying out the castration at 5 weeks and slaughter at 18,5 weeks, an inferior age to the one used in this work, in which a native breed of slow growth was used. Both the juiciness and the flavour may be more relevant due to the late age of the slaughter, normal age in Spain for this time of product. With the passing of time the musculature gets a darker colour since it contains mioglobine (Touraille *et al.*, 1985) and increases its muscular fibre proportion of the type IIa, of oxidative metabolism and decreases those of the type IIb of glucolytic metabolism, and this reduces the possibility of alterations of exudative type (Ono *et al.*, 1993).

Table 1.- Sensorial analysis of the meat of pectorals in non-castrated and castrated in the Castellana Negra native breed..

	NON-CASTRATED	CASTRATED	SIGNIFICATION				
			TYPE	SESSION	TASTER	Ty x S	Ty x Tr
Smell	5,83 ±1,52	5,64 ±1,61	n.s.	*	**	n.s.	n.s.
Tenderness	6,59 ±1,63	6,77 ±1,60	n.s.	n.s.	**	n.s.	n.s.
Juiciness	4,97 ±1,74	5,29 ±1,59	*	n.s.	**	n.s.	n.s.
Fibrosity	4,09 ±2,13	3,74 ±2,01	*	n.s.	**	n.s.	n.s.
Residuo	3,85 ±2,28	3,46 ±2,12	*	n.s.	**	n.s.	n.s.
Flavour	6,14 ±1,06	5,89 ±1,16	*	n.s.	**	n.s.	n.s.
Intensity	6,51 ±1,04	6,46 ±1,07	n.s.	n.s.	**	n.s.	n.s.
Quality	6,58 ±1,34	6,70 ±1,21	n.s.	n.s.	**	n.s.	n.s.
Global appreciation							

n.s.: No significative; * Significative difference ($p \leq 0.05$); ** Significative difference ($p \leq 0.001$)

CONCLUSIONS

The organoleptic quality is modified, increasing due to the effect of castration at an early age. The meat of Castellana Negra capons is more juicy than the one of non-castrated and less fibrous than these, maybe due to their higher fat quantity and the connective tissue which was not so developed.

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REFERENCES

- BENJAMIN, E.W., PIERCE, H.C., TERMOHLEN, W.D (1949). Marketing poultry products. 4th de. John Wiley and Sons, Inc., New York, NY.
- COMA, J., PIQUER, J. (1999). Calidad de la carne en porcino: Efecto de la nutrición. XV Curso de especialización FEDNA. Madrid. España. 199-222.
- CUBILÓ, M.D.; TOR, M. (1996). "Obtención de capons. Técnica quirúrgica". Paper-kite, Lleida.
- CUBILÓ, M.D.; TOR, M. (1999). "La castración precoz en la producción de capones". Nuestra Cabaña, 5. pp. 72-74.
- DALLE ZOTTE, A., VERDIGLIONE, R., REMIGNON, H., COZZI, G., ANDREOLI, D., GOTTARDO, F., ANDRIGHETTO, I. (2000). Effects of breed and castration on muscle fibre type, cross-sectional area and meat tenderness in the beef cattle. 46th ICoMST, Buenos Aires, Argentina, 60-61.
- MAST, M.G., JORDAN, H.C., MACNEIL, J.H. (1981). The effect of partial and complete caponization on growth rate, yield, and selected physical and sensory attributes of cockerels. Poultry Sci., 60: 1827-1833.
- ONO, Y., IWAMOTO, H., TAKAHARA, H. (1993). The relationship between muscle growth and the growth of different fiber types in the chicken. Poultry Sci., 72: 568-576.
- RICARD, F.H., TOURAILLE, C., (1988). Influence du sexe sur les caractéristiques organoleptiques de la viande de poulet. Arch Geflügelk., 52, 27-30.
- TOURAILLE, C., LASSAUT, B., SAUVAGEOT, F. (1985). Qualités organoleptiques des viandes des poulets labels. Viandes et Produits Carnés, 6 (2): 67-72.
- WALTER, J.F. (1976). The effects of surgical caponization on production efficiency and carcass yield of roosters. Poultry Sci., 55: 1372-1375.
- YORK, L.R., MITCHELL, J.D. (1969). The effects of estradiol-17 β -monopalmitate and surgical caponization on production efficiencies yields and organic characteristics of chicken broilers. Poultry Sci., 48: 1532-1536.